



## Waste Management

### Overview

The safe management, storage and disposition of waste materials is a key component of the successful cleanup and closure of the Rocky Flats Environmental Technology Site (RFETS). As a former nuclear weapons component manufacturing facility, Rocky Flats generated a variety of hazardous and radioactive wastes throughout its 40-year operating history. As a cleanup and closure site, additional waste materials will be generated as the site is demolished as part of an accelerated closure plan.

### Waste types

There are several types of waste that were generated during production operations and that will continue to be generated as part of cleanup and closure activities. These include sanitary wastes, hazardous waste materials, and radioactive waste materials. Sanitary wastes include typical office and household trash that may be recycled or disposed in a sanitary landfill. Hazardous wastes include things such as oils, laboratory chemicals, and cleaning and degreasing solvents. Radioactive waste materials include

protective clothing, tools, equipment and sludges that have come in contact with radioactive materials. Waste materials that contain both hazardous and radioactive constituents are referred to as mixed waste.

### Sanitary waste

Sanitary waste is generated at Rocky Flats similar to any office, industrial, or household setting. This material is not contaminated with hazardous or radioactive materials, and generally includes items such as office trash and cafeteria products. Historically, sanitary waste was disposed at landfills located on-site at Rocky Flats. In recent years, this material has been disposed at sanitary landfills outside of Rocky Flats. Some materials, particularly paper products, are recycled through an aggressive waste minimization and recycling program.

### Hazardous waste

At Rocky Flats, hazardous waste materials are regulated by the state of Colorado through the Resource Conservation and Recovery Act (RCRA). Hazardous waste materials

that may be stored on site are managed per RCRA requirements, which specify safe management and storage requirements (i.e., spill protection, adequate aisle space, and periodic inspections). Where appropriate, hazardous waste materials are disposed at commercially licensed disposal facilities. In addition, some hazardous materials are recycled for beneficial re-use as part of the site's waste minimization and recycling program. For example, used motor oils, batteries and copy toner cartridges are recovered and recycled for future use. Some cleaning solvents also are recycled, as are appropriate chemical materials.

### Radioactive waste

Two types of radioactive waste were historically generated and continue to be generated at Rocky Flats as part of cleanup and closure efforts. These include low-level radioactive waste, and a category referred to as Transuranic (TRU) waste. Radioactive waste materials that also contain hazardous constituents are referred to as "mixed" radioactive wastes.

### Low-level waste

Low-level waste (LLW) is waste with a low concentration of radioactive material (less than about one-tenth of that of a typical household smoke detector per gram of material). At Rocky Flats, low-level and low-level mixed wastes are generated by routine activities such as safety system main-

tenance, waste characterization, environmental restoration activities, and stabilization of special nuclear materials. Typical waste consists of rags, protective clothing, paper, wood, filters and laboratory



glassware. Low-level and low-level mixed wastes represent the largest volume of radioactive waste at Rocky Flats. Currently, there are more than 28,000 drum equivalents of LLMW and more than 50,000 drum equivalents of LLW stored on site. In addition, LLW and LLMW are projected to represent the largest volume of radioactive wastes generated during cleanup and closure operations. Approximately 600,000 to 700,000 drum equivalents of LLW and 200,000

to 300,000 drum equivalents of LLMW may be generated during closure activities, depending upon the level of cleanup and facility decommissioning.

Treatment of low-level waste forms is performed for several reasons: to reduce waste volumes; to immobilize liquid wastes; to comply with environmental regulations; or to meet disposal facility requirements. Treatment options may include immobilization (i.e., cementation, polymer encapsulation) and low-temperature thermal desorption, which destroys hazardous chemicals.

The successful cleanup and closure of Rocky Flats is dependent upon the site's ability to safely dispose of low-level waste at appropriate disposal facilities. Low-level wastes not contaminated with hazardous constituents can currently be disposed of at the Nevada Test Site. A private disposal facility in Utah is currently permitted to receive some low-level mixed wastes, but other disposal options remain limited. In recent years, Rocky Flats has accelerated its shipments of low-level wastes to the Utah and Nevada facilities. Shipments of low-level waste are made via commercial tractor-trailer carriers. Until the material is disposed of off-site, it remains stored at Rocky Flats. Available storage space is approaching capacity and additional storage space may be required in the future as more waste is generated as part of cleanup.

### Transuranic waste

Transuranic, or TRU, waste is defined as waste contaminated with alpha-emitting radionuclides of atomic number



greater than 92 (that is, uranium) and half-lives greater than 20 years in concentrations greater than 100 nanocuries per gram (>100 nCi/g).

Transuranic waste at Rocky Flats is primarily contaminated with plutonium and includes such items as sludges, filters, plastic, leaded rubber gloves, ceramic crucibles, glass, resins, combustibles, and scrap metal. The typical TRU waste drum at Rocky Flats contains an amount of plutonium equivalent to less than a single sugar cube of material spread throughout a 55-gallon drum.

TRU waste generated at Rocky Flats is packaged in multiple containers at the point of generation (i.e., in the building where generated). Precise ledgers record all materials placed in the drum. The drums are inspected and examined through Real-Time Radiography before being placed in permitted storage facilities on site. Rocky Flats has been storing TRU and TRU mixed waste on site since 1988,



when shipments of TRU waste to the Idaho National Engineering Laboratory were stopped. Current plans call for this material to be disposed of at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. The waste is disposed at WIPP one-half mile underground in bedded salt

formations that have been geologically stable for 250 million years.

Currently, Rocky Flats has approximately 11,000 drum equivalents of TRU and TRU mixed waste in safe storage. Cleanup and closure of the site is expected to generate an estimated 50,000 to 70,000 drums of additional TRU waste. Rocky Flats initiated its first shipment of TRU waste to WIPP in June 1999. The initial schedule of approximately one shipment per week will gradually be increased to several shipments each week to meet the accelerated cleanup and closure schedule. Because of ongoing generation of waste, the site is evaluating options to increase on-site storage capacity for an interim period to store the material until it can be safely disposed at WIPP. While this material

can be safely and securely stored on site, funds for waste storage must be diverted from cleanup work, which can delay the ultimate closure of Rocky Flats.

#### **Building rubble**

Rocky Flats is evaluating options for the disposition of another category of material that will be generated as part of cleanup and closure. That material is clean (i.e., not contaminated above release limits) building or construction rubble that will be created when buildings are demolished. It is estimated that 111,000 cubic meters of clean building rubble will be generated in the next decade as cleanup proceeds. Options for the disposition of this material include disposing of the material in sanitary landfills or using it as fill material to fill excavations that will be created when buildings and sub-basements are removed. Public and community organizations are actively involved in evaluating the options.

#### **Waste Management Achievements**

The initiation of TRU waste shipments to WIPP was a significant achievement in 1999 and follows several accomplishments that have been recognized in the waste management area.



- The site has shipped offsite to a licensed and permitted disposal facility, certain low-level and low-level mixed waste streams, including the safe removal of all "pondcrete" and "saltcrete" waste forms.
- The total volume of low-level and low-level mixed waste disposal to offsite facilities has increased each year since 1995. Since 1995, the site has removed approximately

16,889 cubic meters of low-level mixed waste, which is the equivalent of more than 81,000 55-gallon drums. During that same time period, more than 7,540 cubic meters of low-level waste or more than 36,000 drum equivalents have been safely disposed of.

- The site has continued an aggressive recycling program, and has safely removed non-radioactive hazardous waste.
- Waste that remains on site continues to be safely stored and managed per requirements of the Resource Conservation and Recovery Act permit administered by the state of Colorado.



U.S. Department of Energy

**Make It Safe. Clean It Up. Close It Down.**



*For further information about Rocky Flats*

Contact DOE Communication at (303) 966-5993, or Kaiser-Hill Communication at (303) 966-2882, or toll free at (800) 269-0157  
(press \*82882# when you hear the automated attendant)

Also, additional information about Rocky Flats is available on the internet at: <http://www.rfets.gov>